

Hudson River. Other unusual features in connection with the progress of this storm eastward from central Michigan were the continuance of thunderstorms throughout the night hours, and the termination of all thunderstorm activity during the daytime of the 18th, at a time when the local heat, due to sunshine, would appear to have been favorable to their continuance.

On the 20th a snowfall of two inches, and continuing at 8.30 p. m., was reported at Deadwood, S. Dak.; Lander, Wyo., where it continued until 8 o'clock, p. m., of the 21st; and at Ogden, Utah.

Snow fell quite generally over Colorado on the night of the 21st, reaching a depth of from 4 to 12 inches. Serious injury was done to fruit trees by breaking the limbs. Most of the fruit was saved. During the night snow also fell in western Nebraska.

On the night of the 22d a violent storm destroyed property, mostly on farms, estimated in value at \$35,000, in the Wisconsin counties of Lincoln and Eau Claire. Other sections of the State also suffered badly in the demolition of houses and telegraph lines. At Oconto the storm is reported as the most severe since 1871. On the same night a wind storm damaged miscellaneous property valued at \$10,000 in Menominee, Mich., and at Alpena, Mich., the wind registered a velocity of 71 miles.

Destructive gales swept over Lakes Superior, Huron, and Michigan on the 28th and 29th. Their coming had been forecast by the United States Weather Bureau office, at Chicago, and serious losses were doubtless thereby prevented. Snow fell in Michigan on the 29th to the depth of several inches in many localities on the upper peninsula, and at a few points in the southern part of the State. Snow was also reported at Lima, Ohio, and at Altoona and Philadelphia, Pa.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The mean temperature is given for each station in Table II, for voluntary observers. Both the mean temperatures and the departures from the normal are given in Table I for the regular stations of the Weather Bureau.

The *monthly mean temperature* published in Table I, for the regular stations of the Weather Bureau, is the simple mean of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

The *regular diurnal period* in temperature is shown by the hourly means given in Table IV for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution* of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the high irregular surface of the Rocky Mountain Plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map. The highest mean temperatures were: Yuma, 84.2, and Key West, 82.0. The lowest mean temperatures were: in the United States, Port Crescent, 49.1, and in Canada, Calgary, 42.6.

As compared with the normal for September, the mean temperature for the current month was deficient in the extreme southern part of the Florida Peninsula, and in the Pacific Coast, northern Rocky Mountain, and northern Slope regions. The largest excesses were: Dubuque, 7.4; La Crosse, 7.2; Omaha, 6.8; Concordia, 6.5; Wichita and Topeka, 6.2; Des Moines and Columbus, Ohio, 6.0. The greatest deficits were: Walla Walla, 7.0; Calgary, 6.9.

Considered by districts the mean temperatures for the cur-

rent month show departures from the normal as given in Table I. The greatest positive departure was Upper Mississippi, 5.5. The greatest negative departure was northern Plateau, 4.0.

The years of highest and lowest mean temperature for September are shown in Table I of the REVIEW for September, 1894. The mean temperature for the current month was the highest on record at: Harrisburg, 69.6; La Crosse, 67.6; Dubuque, 69.8; Des Moines, 69.4; Omaha, 71.2; North Platte, 67.4; Concordia, 73.4; Topeka, 73.1; Dodge City, 72.7; Wichita, 75.2; Kansas City, 73.2; Parkersburg, 73.0; Lexington, 72.8; Raleigh, 75.9; Knoxville, 74.8; Nashville, 75.9; Memphis, 77.8; Little Rock, 78.0; Chattanooga, 75.3; Columbia, 77.6; Atlanta, 76.5; Montgomery, 80.0; Pensacola, 80.6; Mobile, 80.7; New Orleans, 81.7; Palestine, 80.5. It was the lowest on record at: Port Angeles, 50.7; Walla Walla, 58.3; Astoria, 56.2; Roseburg, 57.2; Carson City, 54.8.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: Yuma, 107 (7th); Concordia, 104 (16th); Huron and Sioux City, 103 (17th); Omaha, 102 (17th); Pierre, (9th), North Platte, (17th), 101; Rapid City (13th), Dodge City (5th), Wichita and Palestine (12th), 100. The lowest maxima were: Port Angeles, 62 (28th); Tatoosh Island, 64 (28th); Pysht, 65 (1st); Port Crescent, 66 (28th); East Clallam, 67 (28th). The highest minima were: Key West, 71 (10th); Titusville, 70 (18th); Jupiter, 68 (4th); Tampa (17th), and Port Eads (30th), 66. The lowest minima were: Lander, 7 (22d); Winnemucca, 16 (22d); Williston, 17 (29th); Havre and Carson City, 18 (22d); Idaho Falls, 19 (22d).

The *limit of freezing weather* is shown on Chart VI by the isotherm of minimum 32°, and the limit of frost by the isotherm of minimum 40°.

The years of highest maximum and lowest minimum temperatures are given in the last four columns of Table I of the current REVIEW. During the present month the maximum temperatures were the highest on record at: Northfield, 90; Albany, 97; Nantucket, 86; New London, 93; Woods Hole, 84; Vineyard Haven, 91; Harrisburg, 94; Lynchburg, 99; Norfolk, 100; Cape Henry, 96; Hatteras, 90; Wilmington, 96; Raleigh, 98; Charlotte, 98; Port Huron, 94; Cincinnati, 95; Lexington, 95; Parkersburg, 96; Columbia, 96; Palestine, 100; Dodge City, 100; Concordia, 104; Denver, 96; Cheyenne, 90; North Platte, 101; Omaha, 102; Rapid City, 100; Huron, 103; St. Paul, 96; La Crosse, 97; Green Bay, 95; Dubuque, 97; Bismarck, 96. The minimum temperatures were the lowest on record at: Tampa, 66; Shreveport, 44; Fort Smith, 37; Springfield, Mo., 37; Springfield, Ill., 36; Kansas City, 37; Topeka, 33; Concordia, 29; Wichita, 34; Dodge City, 30; Pueblo, 28; Denver, 27; Cheyenne, 20; Salt Lake City, 29; Lander, 7; Miles City, 22; Williston, 17; Havre, 18; Helena, 26; Walla Walla, 36; Portland, Oreg., 36; Astoria, 40; Eureka, 36; Winnemucca, 16; Carson City, 18; Fresno, 44.

The *greatest daily range of temperature and the extreme monthly range* are given for each of the regular Weather Bureau stations in Table I, which also gives data from which may be computed the extreme monthly ranges for each station. The largest values among the greatest daily ranges were: Miles City, 56; Moorhead, 54; Williston, 53; Winnemucca, 49; Lander, Pueblo, and Carson City, 48. The smallest values were: Corpus Christi, 13; Hatteras, 14; Galveston and Port Eads, 15; Key West and Titusville, 17; Jupiter and Woods Hole, 18; Kittyhawk, 19; Charleston and Tatoosh Island, 20. Among the extreme monthly ranges the largest values were: Lander and Huron, 81; Williston, 78. Sioux City, 76; Concordia and North Platte, 75. The smallest values were: Key West, 19; Titusville, 20; Jupiter, 21; Tatoosh Island, 24; Tampa and Port Eads, 25; Corpus Christi, 26.

The accumulated monthly departures from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the average departures are given in the third column, for comparison with the departures of current conditions of vegetation from the normal conditions.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
New England	+ 0.1	0.0	Middle Atlantic	- 5.5	- 0.6
Upper Lake	+ 4.9	+ 0.5	South Atlantic	-13.4	- 1.5
North Dakota	+ 6.2	+ 0.7	Florida Peninsula	-12.8	- 1.4
Upper Mississippi	+ 3.4	+ 0.4	East Gulf	-14.9	- 1.7
Missouri Valley	+ 5.9	+ 0.7	West Gulf	-14.2	- 1.6
Northern Plateau	+ 1.0	+ 0.1	Ohio Valley and Tenn.	- 8.0	- 0.9
			Lower Lake	- 1.5	- 0.2
			Northern Slope	-10.0	- 1.1
			Middle Slope	- 2.7	- 0.3
			Abilene (southern Slope) ..	-13.7	- 1.5
			Southern Plateau	- 7.1	- 0.8
			Middle Plateau	-12.1	- 1.3
			North Pacific	- 3.0	- 0.3
			Middle Pacific	- 4.9	- 0.5
			South Pacific	- 8.9	- 1.0

MOISTURE.

The quantity of moisture in the atmosphere at any time may be expressed by means of the weight contained in a cubic foot of air, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The rate of evaporation from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporimeter may be made to give the quantity of water evaporated from a similar surface during any interval of time. Such an evaporimeter, therefore, would sum up or integrate the effect of those influences that determine the temperature as given by the wet bulb; from this quantity the average humidity of the air during any given interval of time may be deduced.

The sensible temperature experienced by the human body and attributed to the atmosphere depends not merely upon the temperature of the air, but equally upon the dryness, the velocity of the wind, and the suddenness of atmospheric changes. The temperature of the wet-bulb thermometer as obtained by the whirling apparatus used in the shaded shelter corresponds to the temperature felt by persons standing in the shade of trees or houses, exposed to a natural breeze of at least 6 miles per hour. This temperature and its depression below the dry bulb are the fundamental data for all investigations into the relations between human physiology and the climate. In order to present a monthly summary of the atmospheric conditions from a hygienic and physiological point of view, Table VIII has been prepared, showing the maximum, minimum, and mean readings of the wet-bulb thermometer at 8 a. m. and 8 p. m., seventy-fifth meridian time.

PRECIPITATION.

[In inches and hundredths.]

The distribution of precipitation for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III.

The precipitation was heaviest, 4.00 to 10.00 in the upper Lake Region, 4.00 to 9.00 in the Florida Peninsula, and 4.00 to 6.00 in the valley of the Rio Grande and on the coast of the South Atlantic States, Oregon, and Washington; it was

least, viz: 0.00 in Nevada, southern Florida, and western Arizona.

The diurnal variation is shown by Table XII, which gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 37 are float gauges and 7 are weighing gauges.

The normal precipitation for each month is shown in the Atlas of Bulletin C, entitled "Rainfall and Snow of the United States, compiled to the end of 1891, with annual, seasonal, monthly, and other charts."

The current departures from the normal precipitation are given in Table I, which shows that there was an excess in northern California, Oregon, Alberta, and portions of adjacent States. Elsewhere there was a general deficiency, and especially in eastern Texas, the Gulf, and Atlantic States.

The large excesses were: Indianapolis, 4.6; Sault Ste Marie, 2.9; Nashville, 2.7; Baltimore, 2.2. Deficits: Corpus Christi, 5.5; Galveston, 5.2; Cape Henry, 4.8; Kittyhawk and Norfolk, 4.7; Pensacola, 4.2; Port Eads, 4.1.

The years of greatest and least precipitation for September are given in the REVIEW for September, 1894. The precipitation for the current month was the greatest on record at: Sault Ste. Marie, 7.40; Indianapolis, 7.46; Sacramento, 1.26; Eureka, 3.14. It was the least on record at: Albany, 1.80; Vineyard Haven, 1.15; Cape Henry, 0.00; Lynchburg, 0.56; Raleigh, 0.38; Charlotte, 0.33; Cincinnati, 0.49; Lexington, 0.33; Chattanooga, 1.00; Atlanta, 0.21; Vicksburg, 0.14; Dodge City, 0.06; Port Angeles, 0.35.

The average departure for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normals exceed 100).

Above the normal: Abilene (southern Slope), 139; northern Plateau, 205; middle Pacific, 402.

Below the normal: New England, 51; Middle Atlantic, 36; South Atlantic, 54; Florida Peninsula, 92; east Gulf, 24; west Gulf, 28; Ohio Valley and Tennessee, 67; lower Lakes, 70; upper Lakes, 91; North Dakota, 53; upper Mississippi, 88; Missouri Valley, 74; northern Slope, 78; middle Slope, 36; middle Plateau, 67; north Pacific, 82; south Pacific, 23.

The total accumulated monthly departures from normal precipitation from January 1 to the end of the current month are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Inches.	Per cent.		Inches.	Per cent.
Abilene (southern Slope) ..	+ 5.00	124	New England	- 5.30	84
Southern Plateau	+ 0.40	105	Middle Atlantic	- 7.50	79
			South Atlantic	- 2.70	24
			Florida Peninsula	- 3.30	92
			East Gulf	- 4.30	90
			West Gulf	- 5.40	84
			Ohio Valley and Tenn.	- 9.70	73
			Lower Lakes	- 7.10	73
			Upper Lakes	- 6.30	78
			North Dakota	- 0.70	96
			Upper Mississippi	- 6.50	77
			Missouri Valley	- 3.30	88
			Northern Slope	- 0.40	97
			Middle Slope	- 1.30	93
			Middle Plateau	- 1.10	87
			Northern Plateau	- 2.60	78
			North Pacific	- 1.80	95
			Middle Pacific	- 0.90	95
			South Pacific	- 2.40	80

Details as to excessive precipitation are given in Tables XIII and XIV.

The total snowfall at each station is given in Table II. Its geographical distribution is given on Chart No. VI of total